

REMARKS/ARGUMENTS

Reconsideration is respectfully requested of the Office Action of December 3, 2008, relating to the above-identified application.

A request for a two-month extension of time, together with the associated fee, is filed herewith.

The claims in the case are: Claims 21, 24-27, 29-34, 36 and 38 to 40.

Non-elected Claims 22, 23, 37 and 41 have been deleted without prejudice.

Claim 21 has been amended to specify further details of the process including the step of adding a catalyst to the solution, adding water for the hydrolysis step, defining the molar ratio of H₂O to the metal and defining the alcohol removal step as taking place under reduced pressure. Basis is found in paras. [0025], [0027], [0040], [0049], [0052] and [0053].

The rejection of Claims 21, 24, 27, 29-34, 36 and 38-39 under 35 U.S.C. § 103(a) as unpatentable in view of *Kim* and *Minami* is traversed and reconsideration is respectfully requested.

The *Kim* article, "Surface Modified SiO₂ Xerogel Films from HMDS/Acetone for Intermetal Dielectrics", discloses a process for the production of porous SiO₂ xerogel films from a sol-gel process. In the prior known methods, it was very difficult to avoid shrinkage by capillary forces during the drying of the film. As a result, cracking and collapse of the three-dimensional structure formed in the aging process could occur. The solution proposed by *Kim* is the use of HMDS as a surface modifier in the process combined with acetone as a solvent without solvent exchange for the preparation of SiO₂ xerogel thin films.

The SiO_2 sol shown as being used by *Kim* was prepared using the known two-step acid/base catalyzed procedure of hydrolysis and condensation with tetraethoxysilane (TEOS) as a precursor and acetone as a solvent. The HMDS was used as a modifying agent.

The resulting sol is reported as being transparent. The gelation step was accomplished in seven hours at room temperature. Following that, in a stable range of viscosity the sol was spun on a p-type Si (100) substrate. The wet gel films which are spun on the substrate are then aged in acetone for 24 hours at room temperature. As an essential step in the *Kim* process, the wet-gel films were modified with HMDS in acetone without a solvent exchange step.

It is to be noted that the *Kim* article does not disclose or suggest the step of removing alcohol that is formed during the hydrolysis reaction and thereby forming a sol. In this way, applicants have no need to modify the wet-gel with HMDS.

Kim fails to disclose a step which is important to applicants' invention and, therefore, *Kim* does not suggest that any additional steps are needed to obtain a satisfactory result. In the absence of applicants' disclosure, there is nothing in *Kim* that would lead a person skilled in the art to the claimed invention.

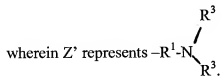
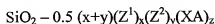
The *Minami* published application, US 2002/0160153 A1, does not provide this missing feature. *Minami* describes a method for producing an article having a predetermined surface pattern. The steps carried out by *Minami* involve disposing a sol-gel material between a patterning die and a substrate in the form of a film and heating to coat the surface of the substrate with a gel film having a surface pattern. The surface pattern is the inverse of the surface pattern of the patterning die. The sol-gel material contains at least one compound selected from the silanes having the formula R^1SiX and at least one compound selected from the group consisting

of the silane compound R^2SiY_3 wherein R^2 is an aryl group or a substituted aryl group, Y is an alkoxy group or a halogen atom. According to paragraph [0034] of *Minami*, dilution solvents can be used including alcohols. However, *Minami* does not describe the removal of the ethanol which is produced by the hydrolyzation of the alkoxides.

There is no suggestion in *Minami* that the process described by *Kim* could be improved in any way by the modifications shown by *Minami*. Applicants respectfully submit that the combination of *Kim* and *Minami* does not create *prima facie* obviousness of the claimed invention and, therefore, the rejection should be withdrawn.

The rejection of Claim 40 under 35 U.S.C. § 103(a) as unpatentable over *Kim* taken with *Ravaine, et al.*, US 4,923,950, is traversed and reconsideration is respectfully requested. The article by *Kim* has already been discussed and it was pointed out that *Kim* fails to teach the step of removing the alcohol which is formed during the hydrolysis reaction.

Ravaine, US 4,923,950, describes a composition comprising a silica derivative modified by organic groups, said derivatives being an amorphous solid having the formula:



This composition is prepared by subjecting a mixture of $Si(O-Alk)_4$, $Si(O-Alk)_3Z^1$ and $Si(O-Alk)_3Z^2$ to a hydrolysis and polycondensation reaction and wherein the water of said solution is of a quantity sufficient to hydrolyze the alkoxy silane groups of the said compounds of the mixture into corresponding silano groups and after completion of the reaction, heating the

resulting gel to a constant weight at a temperature greater than 100°C but lower than the decomposition temperature of the material obtained.

Ravaine does not describe the hydrolyzation of the alkoxide solution in an aprotic solvent, followed by the removal of the alcohol by product.

It is therefore apparent that neither of the cited references discloses or teaches the importance of the alcohol removal step. Consequently, the combination of references fails to establish *prima facie* obviousness of the claimed subject matter.

Withdrawal of the rejection is requested.

Favorable action at the Examiner's earliest convenience is respectfully requested.

Respectfully submitted,

SMITH, GAMBRELL & RUSSELL, LLP

By: 
Robert G. Weilacher, Reg. No. 20,531

Dated: April 29, 2009
Suite 3100, Promenade II
1230 Peachtree Street, N.E.
Atlanta, Georgia 30309-3592
Telephone: (404): 815-3593
Facsimile: (404): 685-6893